

**CALIFORNIA STATE FUEL-EFFICIENT
TIRE REPORT: VOLUME I
(DRAFT)**

SUMMARY OF FINDINGS AND RECOMMENDATIONS

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CALIFORNIA ENERGY COMMISSION

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Disclaimer

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Introduction

This report summarizes the major findings of a study on a potential state fuel-efficient tire program and makes recommendations to satisfy the requirements of Senate Bill 1170. *California State Fuel-Efficient Tire Report, Volume II* is a companion technical report written by Ecos Consulting, the Energy Commission's consultant on this project.

Background

Senate Bill 1170 (Sher, Chapter 912, Statutes of 2001) directed the California Energy Commission (Energy Commission) to investigate and produce recommendations on ways to improve fuel-efficiency of vehicle tires, and specifically provide direction on developing a statewide program to encourage the production and use of more fuel-efficient tires.¹ The Energy Commission must provide its report on a state fuel-efficient tire program no later than January 31, 2003.

This legislation requires the Energy Commission to make recommendations on:

- ☐ Establishing a test procedure for measuring tire fuel-efficiency.
- ☐ Developing a data base of fuel-efficiency of existing tires in order to establish an accurate baseline of tire efficiency.
- ☐ Developing a rating system for tires that provides consumers with information on the fuel-efficiency of individual tire models.
- ☐ Developing a consumer-friendly system to disseminate tire fuel-efficiency information as broadly as possible.
- ☐ Developing a study to determine the safety implications of different policies to promote fuel-efficient replacement tires in the consumer market.
- ☐ Evaluating a mandatory fuel-efficiency standard for all after market tires sold in California.
- ☐ Developing consumer incentive programs that would offer a rebate to purchasers of replacement tires that are more fuel-efficient than the average replacement tire.

To respond to this legislative request, the Energy Commission hired TIAX and Ecos Consulting as contractors to help define the necessary parameters for a fuel-efficient tire program. Stakeholders involved in producing the report include: tire manufacturers, the Energy Foundation, the Natural Resources Defense Council, the Union of Concerned Scientists, the National Renewable Energy Laboratory, the California Integrated Waste Management Board, the California Air Resources Board, the Department of Toxic Substances Control and others. The Energy Commission held two workshops in the fall of 2002, and comments received are included in the attached report.

¹ SB 1170 calls for a study to improve the fuel-efficiency of vehicles in the State's fleet, which is addressed in a separate report.

One of the key questions posed in this report is: Can more fuel-efficient tires be produced without compromising other tire attributes, in particular, safety? Historically, examples can be found where technological improvements in tire composition and design resulted in both fuel-efficiency and safety improvements. The introduction of radial tires several decades ago is one example.

The results from research and tire data collection under this project did not conclusively show what impact, if any, more fuel-efficient tires would have on safety and other characteristics. Therefore, critical tire data must be obtained either from the tire manufacturers or by developing our own testing program to better understand what impact fuel-efficient tires may have on safety.

Below, we outline our recommendations. We expect that, with the required data collection, it would require approximately 24 months and approximately \$700,000 to complete. Additional costs would be incurred if a full-fledged fuel-efficient tire program were then implemented. If the tire industry provides sufficient tire data, additional tire testing by the state may not be necessary. However, if state testing were necessary, an expert contractor would be needed to evaluate such data at a cost of approximately \$150,000.

Funding for this effort has not been identified and the only source of tire-related funding known to staff is the Waste Tire Management Fund. The California Integrated Waste Management Board manages this fund and collects approximately \$28 to \$32 million annually (\$1 per tire) through this fund for the purpose of waste-tire reduction.

We consider the potential of a fuel-efficient tire program as one aspect of a larger strategy to reduce petroleum consumption. Indeed, tires are one of the very few options available for consumers to potentially improve vehicle fuel-efficiency in their existing vehicles.

The companion study: *California State Fuel-Efficient Tire Report, Volume II* examines available information on the use of low-rolling resistance replacement tires and the potential to realize fuel savings. Factors such as cost, wear, safety and other characteristics are discussed in the report and what attributes might be affected from the production of low-rolling resistance tires.

Findings

- Based on preliminary data and modeling, Ecos Consulting found that the use of low-rolling resistance tires – a measure of its fuel-efficiency – could lead to a fuel economy improvement of about three percent. They estimate that, in theory, the maximum fuel savings that could be realized in California using low-rolling resistance tires, is approximately 300 million gallons of gasoline annually. More realistically, if one assumes that a campaign to encourage low-rolling-resistance tires achieved a 25 to 35 percent penetration, gasoline consumption would be reduced in

the state by 77 to 107 million gallons annually. The yearly savings to California consumers from reduced fuel costs would be between approximately \$118 million and \$165 million.² With the expected drop in fuel consumption, state and federal tax revenues (sales and excise) would fall correspondingly. A significant amount of diesel fuel could also be saved through expanding the use of low-rolling-resistance tires used on heavy-duty vehicles. Because of higher loads found on many heavy-duty vehicles, the impact of rolling resistance on vehicle fuel economy is even greater than with passenger vehicles.

Significant additional fuel savings could be realized if a fuel-efficient tire program includes educating and encouraging the public to maintain proper tire inflation which could conservatively save 10 million gallons of gasoline or more each year in California.

- ☐ During the course of the study Ecos Consulting concluded that the Society of Automotive Engineers (SAE) J2452 test procedure was a superior test procedure for measuring rolling resistance since this testing protocol requires testing tires under different speeds and loads. By contrast, the traditional rolling-resistance test method used, SAE J1269, performs the test at constant speed and load and is less reflective of real-world driving conditions.
- ☐ The Energy Commission and its contractors made repeated requests to the tire industry for detailed data on rolling resistance. However, the tire manufacturers, through the Rubber Manufacturers Association (RMA), responded that no data on rolling resistance existed that would be meaningful to this project.

Several industry representatives indicated that customers have not shown any preferences for lower-rolling-resistance tires and only the automobile manufacturers require specifications on tire rolling resistance. Sufficient data was not found during this project to indicate that customers would change their buying patterns if provided information on tire rolling resistance. Ecos Consulting analyzed various labeling systems that could give consumers information about the fuel-efficiency of various tires. At this time tire labeling includes information on the manufacturers name, tire class, maximum cold inflation pressure, tire width, etc., but no information on rolling resistance.

- ☐ Ecos Consulting, in a related project funded by the Energy Foundation, obtained 43 new tires and tested them for rolling resistance at an independent laboratory. Comparisons were then made between the rolling resistance of these tires and various other tire characteristics, such as treadwear, traction, and cost. Unfortunately, the limited tire data did not show a statistically high correlation among the various tire attributes. Substantially more data is needed to gain greater confidence in determining these correlations. Therefore, we cannot conclude whether or not lower-rolling-resistance tires would adversely impact safety or tread wear.

² Assumes gasoline price of \$1.53 per gallon

Furthermore, most consumers are completely unaware that the tire they buy will affect their vehicles' fuel economy. No meaningful information is available to consumers from retail tire sites or other sources. This lack of information makes it impossible for consumers to find out what fuel-efficiency differences exist, if any, between comparable tire models.

- The Rubber Manufacturers Association strongly recommended that maintaining proper tire pressure enhances tire safety, treadwear, and lower rolling resistance. As Ecos Consulting suggests, a program designed to encourage consumers to maintain recommended tire pressure would not detract from a complementary program to promote lower-rolling-resistance tires. Tire-maintenance programs, such as RMA's campaign "Be Smart, Play Your PART," (which stands for Pressure, Alignment, Rotation and Tread) could be implemented quickly and would not require consumers to purchase new tires.

Recommendations

A. Expand Data Collection

The attached report shows that there is insufficient information on low-rolling-resistance tires and their possible impact on safety, tire wear, cost, and other factors to make a strong recommendation on the best way to develop an effective fuel-efficient tire program. The Energy Commission needs a more extensive and comprehensive data-collection and testing program on rolling resistance. We recommend that the Energy Commission be authorized to collect data from at least 700 tires per year. We believe that the data generated from these tests would provide us with enough information on variations of rolling resistance among tires to determine the effect, if any, of low rolling resistance on other tire characteristics. The cost of such a data-collection effort over a two-year period would be approximately \$700,000. This would include testing of 1400 tires (two years at 700 tires per year), employing an expert contractor and other related costs.

Test Data Collected by State	Activity	Hour and Rate	Cost
Test 700 tires/year for 2 years	\$300/test @1400 tests SAE J2452	-	\$420,000
Testing related costs	Various supplies, equipment and travel	-	\$30,000
Expert contractor	Oversee testing process and analyze and evaluate tire test data results	2500 hours @ \$100/hour	\$250,000
Total Cost	-	-	\$700,000

SAE's J2452 test procedure is the preferred method of obtaining data on rolling resistance. This test procedure, while still not used universally, reflects real-world driving conditions compared to the older SAE J1269 test procedure. Because no independent tire testing lab is currently equipped with the hardware to conduct SAE J2452, we recommend that we ask the tire manufacturers to assist us in obtaining this data and solicit other agencies and foundations to help offset the cost for these tests. In

addition to collecting data on tire rolling resistance, we would need to conduct analysis and potentially additional testing to ensure that no significant safety or other important tire attributes are not compromised with fuel-efficient tires.

B. Request Information from Industry

The Energy Commission will request that the tire industry voluntarily provide additional, relevant tire data. It appears that the Energy Commission has the statutory authority to require this data be provided to us. These data should include information on all light-duty vehicle tires offered for sale in California, measured according to SAE J2452. The State could require manufacturers to test their tires at an independent laboratory competitively selected by the State, unless manufacturers recommend an acceptable alternative approach to test their tires themselves and appropriately calibrate their test equipment to ensure comparable results. We would set up a formal challenge process in case disputes arise on results from specific tires. Because the Energy Commission lacks the expertise to interpret highly technical tire data, an expert contractor would be necessary to analyze and evaluate the data, which we estimate would cost approximately \$150,000.

Test Data from Tire OEMs	Activity	Hour and Rate	Cost
Expert contractor	Analyze and evaluate tire data received from manufacturers	1500 hours @ \$100/hour	\$150,000

C. Develop a Tire Efficiency Information Program

To provide consumers with energy efficiency information for tire purchases, we recommend that the Energy Commission develop and propose an information program for tires. As indicated in the attached report, consumers do not know if they are buying energy efficient or energy inefficient tires. With the tire testing program we can provide consumers with an additional piece of data to purchase after market tires.

We recommend that the Energy Commission evaluate the effectiveness of various consumer energy labeling programs and how it would best be applied to tires. At this time the lack of data and the possible negative trade-offs makes it impossible for us to make a specific tire education program recommendation.

D. State Procurement of Efficient Tires

Once we have obtained the sufficient data we will assist California's Department of General Services in developing their procurement bids by including rolling resistance criteria. The companion study under SB 1170 will describe this option and methods to implement efficient tire specifications.

E. Gather Information on Consumer Tire Preferences

To fully understand consumer preferences regarding tires, we recommend that the Energy Commission conduct focus groups. Understanding the trade-offs between the range of factors affecting tire selection, from energy efficiency, to durability, to how a tire is marketed, will help us develop an energy efficient tire program. Like the other recommendations, we will rely on the data gathered in *Recommendation A* as the basis for programmatic decisions as consumers compare fuel-efficiency with other important factors when purchasing tires.

F. Campaign for Proper Tire Inflation

A campaign to promote proper tire inflation and maintenance could complement a program to promote tire efficiency. The Energy Commission agrees that proper tire inflation and care is fundamentally important for efficiency, prolonged tire life, and enhanced safety. We welcome the tire industry's proposal to begin this campaign in California and expect to cooperate and participate in this effort.

G. Research and Development Programs and Agency Coordination

The Energy Commission can also implement a program to support research and develop efforts to improve tire fuel-efficiency and minimize trade-offs discussed above. The Energy Commission has extensive experience conducting energy R&D programs and could extent this work into tires, if it's determined that industry is not adequately supporting fuel-efficiency advancements.

Finally, we recommend that the Energy Commission work closely with the California Integrated Waste Management Board to consider methods of extending tire life which may impact rolling resistance. Testing these methods and their impact on rolling resistance may give the CIWMB additional information in adopting policies and goals relating to tires.